



THE NATIONAL QUALITY FORUM

**National Voluntary
Consensus Standards
for Hospital Care:
An Initial
Performance
Measure Set**

A
CONSENSUS
REPORT

THE NATIONAL QUALITY FORUM

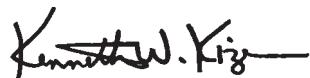
Foreword

The quality of hospital care has dramatically improved since Florence Nightingale laid the foundation for modern hospital quality assurance programs in the 1860s by advocating for a uniform system for collecting and evaluating hospital statistics. However, notwithstanding the seeming miracles that occur daily in this country's nearly 6,000 acute care hospitals, much data today show many opportunities for further improvement in the quality of hospital care. Indeed, recognition of healthcare quality deficiencies combined with rising costs, purchaser activism, and growing consumerism have created an unprecedented demand for hospital care performance data in recent years. This has spurred the development of a plethora of measures and measure reporting instruments. Unfortunately, these have not been standardized, causing much redundancy, inconsistency, and inefficiency of performance measurement reporting efforts, as well as confusion about the resulting data.

The National Quality Forum (NQF) was established in late 1999 to facilitate widespread healthcare quality improvement by, among other things, endorsing national healthcare quality performance measures and designing a national quality of care measurement and reporting system. In response to a request from the Centers for Medicare and Medicaid Services and the Agency for Healthcare Research and Quality, NQF began work to promulgate national voluntary consensus standards for hospital care performance measures in 2001. This report details the initial set of such measures.

The 39 measures presented in this report are intended to promote both public accountability and quality improvement. The measures have been carefully reviewed and endorsed by a diverse group of stakeholders pursuant to the National Technology Transfer and Advancement Act of 1995 and NQF's formal Consensus Development Process. This unprecedented effort to establish national hospital care performance measures for which data can be publicly disclosed will enable patients and family members to make performance-based decisions about hospital selection; stimulate performance improvement by hospitals; facilitate benchmarking and sharing of best practices among healthcare providers; and enhance value-based purchasing.

We thank NQF Members, the Hospital Performance Measures Steering Committee, and participants at the Hospital Performances Measures Workshop for their thoughtful participation in this project. Through their collective efforts we believe that hospital care in the United States will improve.



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National Voluntary Consensus Standards for Hospital Care: An Initial Performance Measure Set

Executive Summary

Hospitals, health plans, and others use a variety of performance measures to assess the quality of hospital care. Yet, while a number of hospital performance measures are currently in use, standardized and uniform measures—intended for public reporting—are not widely available. This marked variation causes confusion and imposes a data collection and reporting burden that can unnecessarily divert resources away from patient care. Additionally, little information on hospital quality is available to patients, and the information that does exist often cannot be compared from hospital to hospital.

This National Quality Forum (NQF) report details 39 voluntary consensus standards for hospital care quality endorsed by NQF. It represents the first-ever set of nationally standardized performance measures to assess the quality of care provided by the more than 6,000 acute care hospitals in the United States.

The endorsed voluntary consensus standards represent eight condition-specific and cross-cutting priority areas for measurement that were identified as high-volume inpatient conditions and important aspects of inpatient care. Implementation of this set and public reporting of the results will begin to provide a roadmap that consumers can use to select high-quality hospital care and will drive the improvement of care by hospitals across the United States. It will also enhance performance-based quality improvement initiatives and create incentives to catalyze value-based purchasing.

National Voluntary Consensus Standards for Hospital Care*

PRIORITY AREA	MEASURE
Acute Coronary Syndrome	1. Aspirin at arrival for acute myocardial infarction (AMI) 2. Aspirin prescribed at discharge for AMI 3. Beta blocker at arrival for AMI 4. Beta blocker prescribed at discharge for AMI 5. AMI inpatient mortality 6. Angiotensin converting enzyme inhibitor (ACEI) for left ventricular systolic dysfunction (LVSD) 7. Percutaneous coronary intervention (PCI) within 120 minutes of arrival for AMI 8. Thrombolytic agent within 30 minutes of arrival for AMI 9. PCI volume 10. PCI mortality 11. Coronary artery bypass graft (CABG) using internal mammary artery 12. CABG volume 13. CABG mortality
Heart Failure	14. Left ventricular function assessment 15. Detailed discharge instructions 16. ACEI for LVSD
Patient Safety	17. Urinary catheter-associated urinary tract infection 18. Central line catheter-associated blood stream infection 19. Ventilator-associated pneumonia 20. Patient falls
Pediatric Conditions	21. Use of relievers for inpatient asthma 22. Use of systemic corticosteroids for inpatient asthma 23. Neonate immunization administration
Pneumonia	24. Oxygenation assessment 25. Initial antibiotic consistent with current recommendations 26. Blood culture collected prior to first antibiotic administration 27. Influenza screen or vaccination 28. Pneumonia screen or pneumococcal vaccination 29. Antibiotic timing
Pregnancy/Childbirth/ Neonatal Conditions	30. Vaginal birth after cesarean delivery rate 31. Third- or fourth-degree laceration 32. Neonatal mortality 33. Cesarean delivery rate
Smoking Cessation	34. Smoking cessation advice/counseling for AMI patients 35. Smoking cessation advice/counseling for heart failure patients 36. Smoking cessation advice/counseling for pneumonia patients
Surgical Complications	37. Timing of antibiotic administration (surgical patients) 38. Selection of antibiotic administration (surgical patients) 39. Duration of prophylaxis (surgical patients)

* See full report for specifications, risk adjustment (if applicable), additional background, and reference material.

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Appendix A

Steering Committee, Workshop Participants, and Project Staff

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Appendix C

Specifications of the National Voluntary Consensus Standards for Hospital Care

The following table summarizes the detailed specifications for each of the National Quality Forum (NQF)-endorsed hospital care performance measures. All information presented has been derived directly from measure sources/developers without modification or alteration (except in those instances when the measure developer agreed to such modification during the NQF Consensus Development Process) and is current as of September 1, 2003.

All NQF-endorsed measures are open source, meaning they are fully accessible, disclosed, and unrestricted.¹ References to related risk-adjustment methodologies, ICD-9-CM codes, and definitions are provided to assure openness and transparency.

Issues regarding any NQF-endorsed measure (e.g., modifications to specifications, emerging evidence) may be submitted to NQF for review and consideration via the "Implementation Feedback Form" found at www.qualityforum.org/implementation_feedback.htm. NQF will transmit this information to the measure developers and/or compile it for consideration in updating the measure set.

¹ National Quality Forum. *Policy on Endorsement of Proprietary Performance Measures*. Washington, DC: National Quality Forum; 2003; www.qualityforum.org.

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
ACUTE CORONARY SYNDROME	1. Aspirin at arrival for acute myocardial infarction (AMI)	Centers for Medicare and Medicaid Services (CMS)-Quality Improvement Organizations (QI0s) and Joint Commission on Accreditation of Healthcare Organizations (JCAHO) (ORX)	Patients who received aspirin within 24 hours before or after hospital arrival	AMI patients without aspirin contraindications (International Classification of Diseases, 9th revision, Clinical Modification [ICD-9-CM] principal diagnosis code of AMI: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91)	<ul style="list-style-type: none"> ■ <18 years of age ■ Transferred to another acute care hospital on day of arrival ■ Received in transfer from another hospital, including another emergency department ■ Discharged on day of arrival ■ Expired on day of arrival ■ Left against medical advice on day of arrival ■ One or more of the following aspirin contraindications/ reasons for not prescribing aspirin documented in the medical record: <ul style="list-style-type: none"> ● Active bleeding on arrival or within 24 hours after arrival; ● Aspirin allergy; ● Warfarin/Coumadin as pre-arrival medication; or ● Other reasons documented by physician, nurse practitioner, or physician assistant for not giving aspirin within 24 hours before or after hospital arrival
	2. Aspirin prescribed at discharge for AMI	CMS-QI0s and JCAHO (ORX)	Patients who are prescribed aspirin at hospital discharge	AMI patients without aspirin contraindications (ICD-9-CM principal diagnosis code of AMI: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91)	<ul style="list-style-type: none"> ■ <18 years of age ■ Transferred to another acute care hospital ■ Expired ■ Left against medical advice ■ Discharged to hospice ■ One or more of the following aspirin contraindications/ reasons for not prescribing aspirin documented in the medical record: <ul style="list-style-type: none"> ● Aspirin allergy; ● Active bleeding on arrival or during hospital stay; ● Warfarin/Coumadin prescribed at discharge; or ● Other reasons documented by physician, nurse practitioner, or physician assistant for not prescribing at discharge

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
ACUTE CORONARY SYNDROME <i>continued</i>	3. Beta blocker at arrival for AMI	CMS-QI0s and JCAHO (ORRX)	Patients who received a beta blocker within 24 hours after hospital arrival	AMI patients without beta blocker contraindications (ICD-9-CM principal diagnosis code of AMI: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91)	<ul style="list-style-type: none"> ▪ <18 years of age ▪ Transferred to another acute care hospital on day of arrival ▪ Received in transfer from another hospital, including another emergency department ▪ Discharged on day of arrival ▪ Expired on day of arrival ▪ Left against medical advice on day of arrival ▪ One or more of the following beta blocker contraindications/reasons for not prescribing beta blocker documented in the medical record: <ul style="list-style-type: none"> ● Beta blocker allergy; ● Bradycardia (heart rate <60 beats per minute) on arrival or within 24 hours after arrival while not on a beta blocker; ● Heart failure (HF) on arrival or within 24 hours after arrival; ● Second- or third-degree heart block on electrocardiogram (ECG) on arrival or within 24 hours after arrival and does not have a pacemaker; ● Shock on arrival or within 24 hours after arrival; ● Systolic blood pressure <90 mm Hg on arrival or within 24 hours after arrival; or ● Other reasons documented by a physician, nurse practitioner, or physician assistant for not giving a beta blocker within 24 hours after hospital arrival

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
ACUTE CORONARY SYNDROME <i>continued</i>	4. Beta blocker prescribed at discharge for AMI	CMS-QI0s and JCAHO (ORRX)	Patients who are prescribed a beta blocker at hospital discharge	AMI patients without beta blocker contraindications (ICD-9-CM principal diagnosis code of AMI: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91)	<ul style="list-style-type: none"> ■ <18 years of age ■ Transferred to another acute care hospital ■ Expired ■ Left against medical advice ■ Discharged to hospice ■ One or more of the following beta blocker contraindications/reasons for not prescribing a beta blocker documented in the medical record: <ul style="list-style-type: none"> ● Beta blocker allergy; ● Bradycardia (heart rate <60 beats per minute) on day of discharge or day prior to discharge while not on a beta blocker; ● Second- or third-degree heart block on ECG on arrival or during hospital stay and does not have a pacemaker; ● Systolic blood pressure >90 mm Hg on day of discharge or day prior to discharge while not on a beta blocker; or ● Other reasons documented by a physician, nurse practitioner, or physician assistant for not prescribing a beta blocker at discharge
	5. AMI inpatient mortality (risk-adjusted) ²	JCAHO (ORRX)	Inpatient mortality of AMI patients	AMI patients (ICD-9-CM principal diagnosis code of AMI: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91)	<ul style="list-style-type: none"> ■ <18 years of age ■ Transferred to another acute care hospital ■ Received in transfer from another acute care hospital ■ Death in the emergency department

² JCAHO risk adjustment methodology based on a logistic regression model; weights for risk factors vary based on data set used. JCAHO information throughout this appendix is current as of September 1, 2003. The most current information, along with additional details necessary to implement the measures, may be accessed at www.jcaho.org.

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
ACUTE CORONARY SYNDROME <i>continued</i>	6. Angiotensin converting enzyme inhibitor (ACEI) for left ventricular systolic dysfunction (LVD)	CMS-QI0s and JCAHO (ORRX)	Patients who are prescribed an ACEI at hospital discharge	AMI patients (ICD-9-CM principal diagnosis code of AMI: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91) with LVD and without ACEI contraindications; and chart documentation of a left ventricular ejection fraction (LVEF) < 40% or a narrative description of left ventricular function (LVF) consistent with moderate or severe systolic dysfunction	<ul style="list-style-type: none"> ■ <18 years of age ■ Transferred to another acute care hospital ■ Expired ■ Left against medical advice ■ Discharged to hospice ■ Chart documentation of participation in a clinical trial testing alternatives to ACEIs as first-line HF therapy ■ One or more of the following ACEI contraindications/ reasons for not prescribing ACEI documented in the medical record: <ul style="list-style-type: none"> ● ACEI allergy; ● Moderate or severe aortic stenosis; or ● Other reasons documented by a physician, nurse practitioner, or physician assistant for not prescribing ACEI at discharge
	7. Percutaneous coronary intervention (PCI) ³ within 120 minutes for AMI	CMS-QI0s	Patients whose time from hospital arrival to PCI is 120 minutes or less	Principal diagnosis of AMI (ICD-9-CM codes: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91); and ST segment elevation or left bundle branch block (LBBG) on the ECG performed closest to hospital arrival; and PCI performed within 24 hours after hospital arrival	<ul style="list-style-type: none"> ■ <18 years of age ■ Received in transfer from another hospital, including another emergency department ■ Administered thrombolytic agents
	8. Thrombolytic agent within 30 minutes of arrival for AMI	CMS-QI0s	Patients with a time from hospital arrival to thrombolysis of 30 minutes or less	Principal diagnosis of AMI (ICD-9-CM codes: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91); and ST segment elevation or LBBB on the ECG performed closest to hospital arrival; and thrombolytic therapy within 6 hours after hospital arrival	<ul style="list-style-type: none"> ■ <18 years of age ■ Transferred from another hospital, including another emergency department

³ Any device attempting to cross one or more coronary lesion; PCI is defined as balloon angioplasty (or percutaneous transluminal angioplasty [PTCA]), rotational atherectomy, directional atherectomy, extraction atherectomy, laser angioplasty, implantation of intracoronary stents, and other catheter devices for treating coronary atherosclerosis. This measure is an update of an existing CMS-QI0 measure of PTCA within 90 minutes and is based on the most current standard of practice. (See appendix E for references.) JCAHO will be adding this measure to its hospital core measures effective July 1, 2004.

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
ACUTE CORONARY SYNDROME <i>continued</i>					
	9. PCI volume	American College of Cardiology (ACC)	All patient admissions with a PCI procedure	N/A	■ None
	10. PCI mortality (risk-adjusted) ⁴	ACC	Patient admissions with a PCI procedure who expired	Patient admissions with a PCI procedure	■ None
	11. Coronary artery bypass graft (CABG) using internal mammary artery (IMA)	CMS	Patients who received an IMA graft (ICD-9 procedure codes 36.15 and 36.16)	Number of patients undergoing isolated CABG (ICD-9 procedure codes 36.10-36.19) who were discharged, transferred, or expired	<ul style="list-style-type: none"> ■ Other heart procedures (ICD-9 procedure codes 37.34, 37.35, 36.2, 35.0-35.9)⁵ ■ Repeat CABG (ICD-9 status code V45.81)
	12. CABG volume	New York State	Patients undergoing isolated CABG surgery, which is defined as bypass of one or more of the coronary arteries with no other major heart surgery during the same admission	N/A	<ul style="list-style-type: none"> ■ Other major heart surgery during the same admission
	13. CABG mortality (risk-adjusted) ⁶	New York State	In hospital deaths (patients who die subsequent to CABG surgery during the same admission or are discharged to hospice)	All patients undergoing isolated CABG surgery	<ul style="list-style-type: none"> ■ Other major heart surgery during the same admission ■ Observed, expected, and risk-adjusted mortality reported

⁴ ACC risk-adjustment methodology based on logistic regression model described in: Shaw RE, et al. Development of a Risk Adjustment Mortality Model Using the American College of Cardiology-National Cardiovascular Data Registry (ACC-NCDR) Experience: 1998-2000. *J Am Coll Cardiology*. 2002; 39(7):1104-1112. Available at www.acc.org/nccdr/pdfs/NCDRIACC2.pdf.

⁵ Request a copy of the ACC-NCDR Risk Adjusted PCI Methodology at www.org/nccdr/risk_request.htm.

⁶ Exclusions represent instances of non-isolated CABG procedures.

⁶ Risk adjusted with New York State Cardiac Surgery Reporting System's logistic regression model as described in New York State Department of Health. *Coronary Artery Bypass Surgery in New York State, 1997-1999*; September 2002. Available at www.health.state.ny.us/nysdoh/consumer/heart/1997-99cabg.pdf. Last accessed June 23, 2003.

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
HEART FAILURE (HF)	14. Left ventricular function (LVF) assessment	CMS-QI0s and JCAHO (ORXX)	Patients with documentation in the hospital record that LVF was assessed before arrival, during hospitalization, or is planned for after discharge	HF patients (ICD-9-CM principal diagnosis code of HF: 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, 428.9)	<ul style="list-style-type: none"> ■ <18 years of age ■ Transferred to another acute care hospital ■ Expired ■ Left against medical advice ■ Discharged to hospice ■ Reasons for no LVF assessment documented by a physician, nurse practitioner, or physician assistant
	15. Detailed discharge instructions	CMS-QI0s and JCAHO (ORXX)	Patients with documentation that they or their caregivers were given written discharge instructions or other educational material addressing all of the following:	HF patients (ICD-9-CM principal diagnosis code of HF: 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, 428.9); and a discharge to home, home care, or home IV therapy	<ul style="list-style-type: none"> ■ <18 years of age

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Inclusions
HEART FAILURE (HF) <i>continued</i>	16. ACEI for LVSD	CMS-QI0s and JCAHO (ORRX)	Patients who are prescribed an ACEI at hospital discharge	<p>HF patients (ICD-9-CM principal diagnosis code of HF: 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93 428.0, 428.1, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, 428.9); with LVSD and without ACEI contraindications and chart documentation of a LVEF <40% or a narrative description of LVF consistent with moderate or severe systolic dysfunction</p> <ul style="list-style-type: none"> ● ACEI allergy; ● Moderate or severe aortic stenosis; or ● Other reasons documented by a physician, nurse practitioner, or physician assistant for not prescribing ACEI at discharge 	<p><18 years of age</p> <p>Transferred to another acute care hospital</p> <p>Expired</p> <p>Left against medical advice</p> <p>Discharged to hospice</p> <p>Chart documentation of participation in a clinical trial testing alternatives to ACEIs as first-line HF therapy</p> <p>One or more of the following ACEI contraindications/ reasons for not prescribing ACEI documented in the medical record:</p> <ul style="list-style-type: none"> ● ACEI allergy; ● Moderate or severe aortic stenosis; or ● Other reasons documented by a physician, nurse practitioner, or physician assistant for not prescribing ACEI at discharge
PATIENT SAFETY	17. Urinary catheter-associated urinary tract infection (UTI) for intensive care unit (ICU) patients	Centers for Disease Control and Prevention (CDC)	Number of indwelling urinary catheter days for ICU patients	<p>Number of indwelling urinary catheter days for ICU patients</p> <p>Reported by type of ICU (coronary, cardiothoracic, medical, medical-surgical [major teaching or all others], neuro-surgical, pediatric, surgical, trauma, burn, and respiratory)</p>	<p>None</p>

⁷ Definitions for infections are given in: Garner JS, et al. CDC Definitions for Nosocomial Infections, in: Olmstead RN, ed. APIC Infection Control and Applied Epidemiology: Principles and Practice. St. Louis: Mosby; 1996:A1-A20. Available at www.apic.org/pdf/edcefs.pdf.

⁸ Personal communication, Linda McKibben, MD, MPH, Medical Officer, DCD/NCID, Division of Healthcare Quality Promotion/Prevention and Evaluation Branch, October 21, 2002.

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Inclusions
PATIENT SAFETY <i>continued</i>	18. Central line catheter-associated blood stream infection rate for ICU patients	CDC	Number of central line-associated blood stream infections (laboratory-confirmed blood stream infection or clinical sepsis) ^{7,8} times 1,000	Number of central line days for ICU patients ■ Reported by type of ICU (coronary, cardiothoracic, medical, medical-surgical [major teaching or all others], neuro-surgical, pediatric, surgical, trauma, burn, and respiratory)	■ None
	19. Ventilator-associated pneumonia rate for ICU patients	CDC	Number of ventilator-associated pneumonia times 1,000 ⁷	Number of ventilator days for ICU patients ■ Reported by type of ICU (coronary, cardiothoracic, medical, medical-surgical [major teaching or all others], neuro-surgical, pediatric, surgical, trauma, burn, and respiratory)	■ None
	Ventilator-associated pneumonia for high-risk nursery (HRN) patients		Number of ventilator-associated pneumonia times 1,000 ⁷	Number of ventilator days for HRN patients ■ Reported for HRNs by birth weight category (<1,000, 1,001-1,500, 1,501-2,500, and >2,500g)	■ None ■ Reported by care setting (critical care, step-down, and medical/surgical). Stratified by hospital bed size (under 100, 100-199, 200-299, 300-399, 400-499, 500 or more) ■ Reported as all falls and falls with injury ⁹
	20. Falls per 1,000 patient days	American Nurses Association (ANA) and California Nursing Outcomes Coalition	Total number of patient falls times 1,000 ("falls" is defined as "patients who experience an unplanned descent to the floor").	Total number of patient days ■ Reported by care setting (critical care, step-down, and medical/surgical). Stratified by hospital bed size (under 100, 100-199, 200-299, 300-399, 400-499, 500 or more) ■ Reported as all falls and falls with injury ⁹	■ None

⁹ The ANA's data collection tool for this measure uses a monthly patient fall report that captures more specific information about the incidents (e.g., whether injuries from falls were minor, moderate, major, or resulted in death) than is actually reported for the measure in the ANA's National Database of Nursing Quality Indicators reports; this level of detail is not part of the standard measure.

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
PEDIATRIC CONDITIONS	21. Use of relievers for inpatient asthma	Child Health Corporation of America (CHCA)	Patients who receive eligible relievers (table 1)	ICD-9-CM principal diagnosis code starting with 493 ■ Reported in American Academy of Pediatrics (AAP) age groups: 0-2, 3-5, 6-17 years of age	■ Age >17 years of age
	22. Use of systemic corticosteroids for inpatient asthma	CHCA	Patients who received eligible systemic anti-inflammatory drugs (table 1)	ICD-9-CM principal diagnosis code starting with 493 ■ Reported in AAP age groups: 0-2, 3-5, 6-17 years of age	■ Age >17 years of age
	23. Neonate immunization administration	CHCA	Patients who receive required immunizations during their inpatient stay (length of stay > 60 days). Required immunizations: Diphtheria/Pertussis/Tetanus (DPT), Hepatitis B (HepB), Polio, Haemophilus influenza B (Hib), Pneumococcal conjugate vaccine (PCV) (table 2)	All-patient refined diagnostic-related groups (APR-DRG) for neonates ■ Mortalities ■ Parental refusal (documentation in medical record clearly indicating the parent did not wish the child to be immunized. Parental refusal may be documented any time during the hospital stay)	

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
PNEUMONIA	24. Oxygenation assessment	CMS-QI0s and JCAHO (ORRX)	Patients who receive oxygenation assessment with arterial blood gas (ABG) or pulse oximetry within 24 hours prior to or after hospital arrival	Pneumonia patients (ICD-9-CM principal diagnosis code of 480.0-483.8, 485-486, or 487.0 [pneumonia]; or ICD-9-CM principal diagnosis code of 038.XX [septicemia] or 518.81 ¹⁰ [respiratory failure], and a secondary diagnosis of pneumonia)	<ul style="list-style-type: none"> ■ Received in transfer from another acute care or critical access hospital ■ No working diagnosis of pneumonia at the time of admission ■ Receiving comfort care only ■ <29 days of age
	25. Initial antibiotic regimen consistent with current recommendations	CMS-QI0s	Patients who receive an initial antibiotic regimen consistent with current guidelines within the first 24 hours of hospitalization (table 3)	Pneumonia patients (ICD-9-CM principal diagnosis code of 480.0-483.8, 485-486, or 487.0 [pneumonia]; or ICD-9-CM principal diagnosis code of 038.XX [septicemia] or 518.81 ¹⁰ [respiratory failure], and a secondary diagnosis code of pneumonia)	<ul style="list-style-type: none"> ■ Received in transfer from another acute care or critical access hospital ■ No working diagnosis of pneumonia at the time of admission ■ Receiving comfort measures only (palliative care) ■ No antibiotics received during the hospitalization or within 36 hours of arrival at the hospital ■ Immunocompromised (based on comorbidity) ■ Potentially have nosocomial pneumonia (index admission within 14 days of a previous admission) ■ Insufficient arrival or antibiotic timing data in medical record
	26. Blood culture collected prior to first antibiotic	CMS-QI0s and JCAHO (ORRX)	Patients whose initial blood cultures are performed prior to the administration of the first hospital dose of antibiotics	Pneumonia patients (ICD-9-CM principal diagnosis code of 480.0-483.8, 485-486, or 487.0 [pneumonia]; or ICD-9-CM principal diagnosis code of 038.XX [septicemia] or 518.81 ¹⁰ [respiratory failure], and a secondary diagnosis code of pneumonia)	<ul style="list-style-type: none"> ■ Received in transfer from another acute care or critical access hospital ■ No working diagnosis of pneumonia at the time of admission ■ Receiving comfort measures only (palliative care) ■ Insufficient blood culture, antibiotic administration and arrival timing data in medical record ■ <29 days of age ■ Not receiving antibiotics or a blood culture during the stay

¹⁰ Principal diagnosis code 518.84 (acute and chronic respiratory failure) can be added to 518.81.

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
PNEUMONIA <i>continued</i>	27. Influenza screen or vaccination	CMS-QI0s	Patients who are screened for influenza vaccine status and are vaccinated prior to discharge, if indicated	Pneumonia patients [ICD-9-CM principal diagnosis code of 480.0-483.8, 485-486, or 487.0 [pneumonia]; or [CD-9-CM principal diagnosis code of 038.XX [septicemia] or 518.81 ¹⁰ [respiratory failure], and a secondary diagnosis code of pneumonia]	<ul style="list-style-type: none"> ■ <50 years of age ■ Discharged in months other than October–February ■ Received in transfer from another acute care or critical access hospital ■ No working diagnosis of pneumonia at the time of admission ■ Receiving comfort measures only (palliative care) ■ Expired in the hospital ■ Left the hospital against medical advice ■ Discharged to hospice care ■ Principle or secondary diagnosis of 487.0 (influenza with pneumonia) ■ Transferred to another short-term general hospital for inpatient care
	28. Pneumonia screen or pneumococcal vaccination	CMS-QI0s and JCAHO (ORRX)	Patients who were screened for pneumococcal vaccine status and are vaccinated prior to discharge, if indicated	Pneumonia inpatients age 65 and older [ICD-9-CM principal diagnosis code of 480.0-483.8, 485-486, or 487.0 [pneumonia]; or [CD-9-CM principal diagnosis code of 038.XX [septicemia] or 518.81 ¹⁰ [respiratory failure], and a secondary diagnosis code of pneumonia]	<ul style="list-style-type: none"> ■ < 65 years of age ■ Received in transfer from another acute care or critical access hospital ■ No working diagnosis of pneumonia at the time of admission ■ Receiving comfort measures only (palliative care) ■ Expired in the hospital ■ Left the hospital against medical advice ■ Discharged to hospice care
	29. Antibiotic timing	CMS-QI0s	Patients who received their first dose of antibiotics within 4 hours after hospital arrival	Pneumonia patients [ICD-9-CM principal diagnosis code of 480.0-483.8, 485-486, [pneumonia] or 487.0 [influenza with pneumonia]; or [CD-9-CM principal diagnosis code of 038.XX [septicemia] or 518.81 ¹⁰ [respiratory failure] and a secondary diagnosis code of pneumonia)	<ul style="list-style-type: none"> ■ Received in transfer from another acute care or critical access hospital ■ No working diagnosis of pneumonia at the time of admission ■ Receiving comfort measures only (palliative care) ■ No antibiotics received during the hospitalization or within 36 hours of hospital arrival ■ Insufficient arrival or antibiotic timing data (i.e., missing date and/or time) in medical record ■ <29 days of age

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
PREGNANCY/ CHILDBIRTH/ NEONATAL CONDITIONS	30. Vaginal birth after cesarean delivery rate (risk- adjusted) ^{2,11,12}	JCAHO (ORX)	Patients with vaginal birth after cesarean delivery	All patients who delivered with a history of previous cesarean delivery (ICD-9-CM principal diagnosis code or other diagnosis codes on tables 4.01-4.02, 4.03 and 4.04 of JCAHO specifications manual AND code of 654.21 [previous cesarean delivery])	<ul style="list-style-type: none"> ■ ICD-9-CM principal diagnosis code or ICD-9-CM other diagnosis code for abortion (as defined in table 4.06 of JCAHO specifications manual) ■ Delivery by cesarean section (as defined in table 4.07 of JCAHO specifications manual) excluded from numerator only
	31. Third or fourth degree laceration (risk- adjusted) ^{2,12}	JCAHO (ORX)	Patients with third- or fourth- degree perineal laceration (ICD-9-CM principal or other diagnosis code for third- or fourth-degree perineal lacer- ation as defined in table 4.05 of JCAHO specifications manual)	All patients with vaginal deliveries (ICD-9-CM principal or other diagnosis codes for pregnancy with delivery as defined in tables 4.01-4.04 of JCAHO specifications manual)	<ul style="list-style-type: none"> ■ ICD-9-CM principal or other procedure code for cesarean delivery (as defined in table 4.07 of JCAHO specifications manual) ■ ICD-9-CM principal or other diagnosis code for abortion (as defined in table 4.06 of JCAHO specifications manual)
	32. Neonatal mortality (risk- adjusted) ^{2,12}	JCAHO (ORX)	All neonates who expire at facility within 28 days of birth	All live-born neonates (includes transfers from another facility)	<ul style="list-style-type: none"> ■ None
33. Cesarean delivery rate	Healthy People 2010	Number of births delivered by cesarean section	Number of live births to low-risk females giving birth for the first time (low risk = singleton fetus, vertex presentation, and term fetus [at least 37 weeks])	<ul style="list-style-type: none"> ■ None 	

¹¹ This measure is a neutral measure of performance – it is not clear whether an increase or decrease is reflective of improved quality.

¹² ICD-9 codes from the JCAHO specifications manual are based on those in appendix A: ICD-9-CM Code Tables in: *Specifications Manual for National Implementation of Hospital Core Measures*. Chicago, IL: Joint Commission on Accreditation of Healthcare Organizations; November 2001. The report can be downloaded at www.jcaho.org/pms/core+measures/a_appendix_a.pdf.

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions
SMOKING CESSATION	34. Smoking cessation advice/counseling for AMI	CMS-QI0s and JCAHO (ORX)	Smoking cessation advice or counseling given during hospitalization	AMI patients (ICD-9-CM principal diagnosis code of 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91); and a history of smoking cigarettes anytime during the year prior to hospital arrival	<ul style="list-style-type: none"> ■ < 18 years of age ■ Transferred to another acute care hospital ■ Expired ■ Left against medical advice ■ Discharged to hospice
	35. Smoking cessation advice for HF	CMS-QI0s and JCAHO (ORX)	Smoking cessation advice or counseling given during hospitalization	HF patients (ICD-9-CM principal diagnosis code of 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, 428.20, 428.21, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, 428.9), and a history of smoking cigarettes anytime during the year prior to hospital arrival	<ul style="list-style-type: none"> ■ < 18 years of age ■ Transferred to another acute care hospital ■ Expired ■ Left against medical advice ■ Discharged to hospice
	36. Smoking cessation advice for pneumonia	CMS-QI0s and JCAHO (ORX)	Smoking cessation advice or counseling given during hospitalization	Pneumonia patients (ICD-9-CM principal diagnosis code of 480.0-483.8, 485-486, or 487.0 [pneumonia]; or a principal diagnosis code of 038.xx [sepsis] or 518.81 ¹⁰ [respiratory failure], and a secondary diagnosis code of pneumonia); and a history of smoking cigarettes anytime during the year prior to hospital arrival	<ul style="list-style-type: none"> ■ Transferred to another acute care hospital ■ Left against medical advice ■ Discharged to hospice ■ Expired ■ No working diagnosis of pneumonia on admission ■ Receiving comfort measures only ■ < 18 years of age

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions	
SURGICAL COMPLICATIONS	37. Timing of antibiotic administration for surgical patients	CMS-QI0s	Surgical patients who received prophylactic antibiotics within 1 hour of surgical incision (2 hours if receiving vancomycin)	Number of surgical patients with CABG (ICD-9-CM procedure codes 36.10-36.14, 36.19-36.15-36.17, 36.2), other cardiac surgery (35.0-35.95, 35.98-35.99), colon surgery (45.00-45.03, 45.41-45.49, 45.50, 45.7-45.90, 45.92-45.95, 46.03, 46.04, 46.1-46.14, 46.52, 46.75, 45.76, 46.91, 46.92, 46.94, 48.5, 48.6-48.69), hip arthroplasty (81.51, 81.52), knee arthroplasty (81.54), abdominal hysterectomy (68.3, 68.4, 68.6), vaginal hysterectomy (68.5-68.59, 68.7), or vascular surgery (38.34, 38.36, 38.37, 38.44, 38.48, 38.49, 38.51, 38.52, 38.64, 38.14, 38.16, 38.18, 39.25, 39.26, 39.29)	Number of surgical patients with CABG (ICD-9-CM procedure codes 36.10-36.14, 36.19-36.15-36.17, 36.2), other cardiac surgery (35.0-35.95, 35.98-35.99), colon surgery (45.00-45.03, 45.41-45.49, 45.50, 45.7-45.90, 45.92-45.95, 46.03, 46.04, 46.1-46.14, 46.52, 46.75, 45.76, 46.91, 46.92, 46.94, 48.5, 48.6-48.69), hip arthroplasty (81.51, 81.52), knee arthroplasty (81.54), abdominal hysterectomy (68.3, 68.4, 68.6), vaginal hysterectomy (68.5-68.59, 68.7), or vascular surgery (38.34, 38.36, 38.37, 38.44, 38.48, 38.49, 38.51, 38.52, 38.64, 38.14, 38.16, 38.18, 39.25, 39.26, 39.29)	<ul style="list-style-type: none"> ■ Principal or admission diagnosis suggestive of pre-operative infectious disease: <ul style="list-style-type: none"> ● Infectious diseases (001.0-139.8) ● Meningitis (320.0-326) ● Ear infection (380.0-380.23, 382.0-382.20) ● Endocarditis (421.0-422.99) ● Respiratory (460-466.19; 472-476.1; 480-487.8; 490-491.9; 510-511.9; 513-513.1) ● Digestive (540-542; 575.0) ● Renal (590-590.9; 595.0) ● Prostate (601.0-601.9) ● Gynecologic (614-614.9; 616-616.4) ● Skin (680-686.9) ● Musculo-skeletal (711.9-711.99, 730-730.99) ● Fever of unknown origin (780.6) ● Septic shock (785.59) ● Bacteremia (790.7) ● Viremia (790.8) ■ Receiving antibiotics at the time of admission (except colon surgery patients taking oral prophylactic antibiotics) ■ Medical records do not include antibiotic start date/time or incision date/time ■ Receiving antibiotics > 24 hours prior to surgery (except colon surgery patients taking oral prophylactic antibiotics) ■ Colon surgery patients who received oral prophylactic antibiotics only

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Exclusions	
SURGICAL COMPLICATIONS <i>continued</i>	38. Selection of antibiotic administration for surgical patients	CMS-QI0s	Surgical patients who received recommended prophylactic antibiotics for specific surgical procedures (table 4)	Number of surgical patients with CABG (ICD-9-CM procedure codes 36.10-36.14, 36.19-36.15-36.17, 36.2), other cardiac surgery (35.0-35.95, 35.98-35.99), colon surgery (45.00-45.03, 45.41-45.49, 45.50, 45.7-45.90, 45.92-45.95, 46.03, 46.04, 46.1-46.14, 46.52, 46.75, 45.76, 46.91, 46.92, 46.94, 48.5, 48.6-48.69), hip arthroplasty (81.51, 81.52), knee arthroplasty (81.54), abdominal hysterectomy (68.3, 68.4-68.6), vaginal hysterectomy (68.5-68.59, 68.7), or vascular surgery (38.34-38.36, 38.37, 38.44, 38.48, 38.49, 38.51, 38.52, 38.64, 38.14, 38.16, 38.18, 39.25, 39.26, 39.29)	Principal or admission diagnosis suggestive of pre-operative infectious disease: Infectious diseases (001.0-139.8) ● Meningitis (320.0-326) ● Ear infection (380.0-380.23; 382.0-382.20) ● Endocarditis (421.0-422.99) ● Respiratory (460-466.19; 472-476.1; 480-487.1; 490-491.9; 510-511.9; 513-513.1) ● Digestive (540-542; 575.0) ● Renal (590-590.9; 595.0) ● Prostate (601.0-601.9) ● Gynecologic (614-614.9; 616-616.4) ● Skin (680-686.9) ● Musculo-skeletal (711.9-711.99, 730.0-730.99) ● Fever of unknown origin (780.6) ● Septic shock (785.59) ● Bacteremia (790.7) ● Viremia (790.8)	■ Principal or admission diagnosis suggestive of pre-operative infectious disease: Infectious diseases (001.0-139.8) ● Meningitis (320.0-326) ● Ear infection (380.0-380.23; 382.0-382.20) ● Endocarditis (421.0-422.99) ● Respiratory (460-466.19; 472-476.1; 480-487.1; 490-491.9; 510-511.9; 513-513.1) ● Digestive (540-542; 575.0) ● Renal (590-590.9; 595.0) ● Prostate (601.0-601.9) ● Gynecologic (614-614.9; 616-616.4) ● Skin (680-686.9) ● Musculo-skeletal (711.9-711.99, 730.0-730.99) ● Fever of unknown origin (780.6) ● Septic shock (785.59) ● Bacteremia (790.7) ● Viremia (790.8) ■ Receiving antibiotics at the time of admission (except colon surgery patients taking oral prophylactic antibiotics) ■ Medical records do not include antibiotic start date/time or incision date/time, or surgery end date/time ■ Receiving antibiotics > 24 hours prior to surgery (except colon surgery patients taking oral prophylactic antibiotics) ■ No antibiotics received before or during surgery or within 24 hours after surgery end time (i.e., patient did not receive any prophylactic antibiotics) ■ No antibiotics received during the hospitalization

Appendix C – Specifications of the National Voluntary Consensus Standards for Hospital Care (continued)

Area	Measure	Source of Measure	Numerator	Denominator	Inclusions	
SURGICAL COMPLICATIONS <i>continued</i>	39. Duration of prophylaxis for surgical patients	CMS-QI0s	Surgical patients whose prophylactic antibiotics were discontinued within 24 hours after surgery end time	Number of surgical patients with CABG (ICD-9-CM procedure codes 36.10-36.14, 36.19-36.15-36.17, 36.2), other cardiac surgery (35.0-35.95, 35.98-35.99), colon surgery (45.00-45.03, 45.41-45.49, 45.50, 45.7-45.90, 45.92-45.95, 46.03, 46.04, 46.1-46.14, 46.52, 46.75, 45.76, 46.91, 46.92, 46.94, 48.5, 48.6-48.69), hip arthroplasty (81.51, 81.52), knee arthroplasty (81.54), abdominal hysterectomy (68.3, 68.4, 68.6), vaginal hysterectomy (68.5-68.59, 68.7), or vascular surgery (38.34, 38.36, 38.37, 38.44, 38.48, 38.49, 38.51, 38.52, 38.64, 38.14, 38.16, 38.18, 39.25, 39.26, 39.29)	Number of surgical patients with CABG (ICD-9-CM procedure codes 36.10-36.14, 36.19-36.15-36.17, 36.2), other cardiac surgery (35.0-35.95, 35.98-35.99), colon surgery (45.00-45.03, 45.41-45.49, 45.50, 45.7-45.90, 45.92-45.95, 46.03, 46.04, 46.1-46.14, 46.52, 46.75, 45.76, 46.91, 46.92, 46.94, 48.5, 48.6-48.69), hip arthroplasty (81.51, 81.52), knee arthroplasty (81.54), abdominal hysterectomy (68.3, 68.4, 68.6), vaginal hysterectomy (68.5-68.59, 68.7), or vascular surgery (38.34, 38.36, 38.37, 38.44, 38.48, 38.49, 38.51, 38.52, 38.64, 38.14, 38.16, 38.18, 39.25, 39.26, 39.29)	<ul style="list-style-type: none"> ■ Principal or admission diagnosis suggestive of pre-operative infectious disease: <ul style="list-style-type: none"> ● Infectious diseases (001.0-139.8) ● Meningitis (320.0-326) ● Ear infection (380.0-380.23, 382.0-382.20) ● Endocarditis (421.0-422.99) ● Respiratory (460-466.19; 472-476.1; 480-487.1; 490-491.9; 510-511.9; 513-513.1) ● Digestive (540-542; 575.0) ● Renal (590-590.9; 595.0) ● Prostate (601.0-601.9) ● Gynecologic (614-614.9; 616-616.4) ● Skin (680-686.9) ● Musculo-skeletal (711.9-711.99; 730-730.99) ● Fever of unknown origin (780.6) ● Septic shock (785.59) ● Bacteremia (790.7) ● Viremia (790.8) ■ Receiving antibiotics at the time of admission (except colon surgery patients taking oral prophylactic antibiotics) ■ Medical records do not include antibiotic start date/time, incision date/time, antibiotic end date/time, surgery end date/time ■ Receiving antibiotics > 24 hours prior to surgery (except colon surgery patients taking oral prophylactic antibiotics) <ul style="list-style-type: none"> ■ No antibiotics received before or during surgery or within 24 hours after surgery end time (i.e., patient did not receive any prophylactic antibiotics) ■ Diagnosed with and treated for infections within two days after surgery date ■ No antibiotics received during hospitalization

Table 1 – ELIGIBLE DRUGS FOR CHCA PEDIATRIC MEDICATION USE MEASURES

CATEGORY	THERAPEUTIC CATEGORY	GENERIC NAME (ICCS)	BRAND NAME
Relievers	Beta2-agonist (short acting)	Albuterol 471210, 471810	Airet Proventil Proventil HFA Ventolin Ventolin otopicap
		Levalbuterol 471275	Xopenex
		Bitolterol/Pirbuterol 471220, 471292	
	Anti-cholinergics	Ipratropium Bromide 471810, 479025	Atrovent
	Systemic Beta2-agonists	Epinephrine 471240, 431430	Epinephrine
		Terbutaline 471290	Terbutaline
Systemic corticosteroids	Systemic corticosteroids	Prednisone 465400	Prednisone Deltasone Orasone Liquid Pred Prednisone Intensol
		Hydrocortisone 465341, 465343, 465344, 465345, 465338, 465340	
		Dexamethasone 465270, 465271, 465272	
		Methylprednisolone 465365, 465370, 465371, 465372	Medrol Solu-Medrol
		Prednisolone 465387, 465390, 465392	Pediapred Prealone

Table 2 – Recommended Immunizations

Numerator 1: Diphtheria, Tetanus, Pertussis (DPT)	DTP • DPT • DtaP • DTw-P-HbOC • DTwP-HIB • Acel-Imune • Tripedia • Infanrix • Tetramune (DTPH) • Tripedia/ActHIB • TriHIBit • Certiva • Immunol
Numerator 2: Hepatitis B (HepB)	Comvax • Recombivax HB • Enerix-B
Numerator 3: Polio	IPOV • IPV • OPV • Orlimune • Poliovax
Numerator 4: <i>Haemophilus influenza type b</i> (Hib)	PedvaxHIB • HibTITER • ProHIBit (PRP-D) • Tetramune (DTPH) • Tripedia/ActHIB • TriHIBit • ActHIB • OmniHIB (PRP-T) • Comvax
Numerator 5: Pneumococcal (PCV)	Prevnar • Pneumovax • Pnu-Imune

Table 3 – Antibiotic Guidelines

NON-ICU	ICU	ICU with PSEUDOMONAL RISK*
β -lactam (IV or IM) + macrolide (IV or Oral) or quinolone monotherapy (IV or Oral) or β -lactam (IV or IM) + doxycycline (IV or Oral) β -lactam = ampicillin-sulbactam, cefotaxime, ceftriaxone Macrolide = azithromycin, clarithromycin (oral), erythromycin Quinolones = gatifloxacin, levofloxacin, moxifloxacin	β -lactam (IV) + macrolide (IV) or β -lactam (IV) + quinolone (IV) If documented β -lactam allergy: quinolone (IV) + clindamycin (IV) or quinolone (IV) + vancomycin (IV) β -lactam = ampicillin-sulbactam cefotaxime, ceftriaxone Macrolide = azithromycin, erythromycin Quinolones = gatifloxacin, levofloxacin, moxifloxacin	<p>*In addition to the antibiotics listed under ICU, if the patient had a secondary ICD-9 code of bronchiectasis, or a positive response to the bronchiectasis question, or malnutrition (as reflected by a serum albumin below 3), these antibiotics would also be considered acceptable:</p> <p>Antipseudomonal β-lactam (IV) + antipseudomonal quinolone (IV) or antipseudomonal β-lactam (IV) + aminoglycoside (IV) + either a macrolide (IV) or antipneumococcal quinolone (IV)</p> <p>If documented β-lactam allergy: Aztreonam (IV) + aminoglycoside (IV) + antipneumococcal quinolone (IV)</p> <p>Antipseudomonal β-lactam = (cefepime, imipenem, meropenem, piperacillin-tazobactam) Macrolide = azithromycin, erythromycin Aminoglycosides = amikacin, gentamicin, tobramycin Antipseudomonal quinolone = ciprofloxacin Antipneumococcal quinolones = gatifloxacin, levofloxacin, moxifloxacin</p>

Table 4 – Recommended Prophylactic Antibiotics

SURGICAL PROCEDURE	APPROVED ANTIBIOTICS
Cardiac or Vascular	Cefazolin or cefuroxime or cefamandole or vancomycin* or clindamycin*
Hip/Knee Arthroplasty	Cefazolin or cefuroxime or vancomycin* or clindamycin*
Colon	<p>Oral: after effective mechanical bowel preparation, neomycin sulfate + erythromycin base or neomycin sulfate + metronidazole administered for 18 hours preoperatively</p> <p>Parenteral: Cefoxitin or cefotetan or cefmetazole or cefazolin + metronidazole</p> <p>*See note for β-lactam allergy</p>
Hysterectomy	<p>Cefazolin or cefotetan or cefoxitin or cefuroxime</p> <p>*See note for β-lactam allergy</p>
<i>*Special Considerations</i>	For cardiac, orthopedic, and vascular surgery, if the patient is allergic to β -lactam antibiotics, vancomycin or clindamycin are acceptable substitutes. For hysterectomy and colon surgery, no guideline recommendations for parenteral antimicrobial prophylaxis have been published for patients with β -lactam allergy. Until additional recommendations are published, this group of patients is excluded from the denominator.

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